PATHFINDER

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An informal newsletter produced for the GPS user community by Army PM GPS, Fort Monmouth, NJ. Information presented is based on published and submitted news items of interest to the general user. Widest dissemination and reproduction is encouraged. Newsworthy items are solicited for inclusion.
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The PATHFINDER can be found online at: http://army-gps.robins.af.mil

PM's Corner

Hello GPS Users!

With winter upon us in most places, I hope you've included PLGR and PLGR batteries in your cold weather preventive maintenance checks.

It's also that time of year to coordinate with your COMSEC custodian for the annual update of your COMSEC Group Unique Variable (GUV) key. Of course you remember that the GUV key is required to access the Precise Positioning Service (PPS) signal for optimum performance with a military GPS receiver. The PPS signal provides the highest precision and anti-jam protection. Without a COMSEC key, your PLGR operates like a standard commercial GPS receiver. Review the notes on the GUV key elsewhere in this issue.

Otherwise, your Army GPS folks continue working the details to introduce the next generation of GPS receivers to the Army. If you have any specific questions, feel free to contact me or any of the PM GPS offices.

LTC Eveland

My PLGR has an expired date on the Warranty Label? Now what?

NOTE: The following information only applies to Army and USAF Users. The Navy did not participate in the program to extend the PLGR warranty!

You have a faulty AN/PSN-11 Precision Lightweight GPS Receiver (PLGR). The expiration date on the warranty label has passed. How do you get it repaired? Simple answer: Follow the same procedures as before! The Army and USAF extended PLGR warranty coverage so even if the warranty expiration date on the label of an older PLGR has passed, it is still covered! (No, we are not issuing replacement warranty labels with new expiration dates). One exception applies, just as it did before: If the damage is judged to be outside of warranty coverage, the PLGR will be replaced by the exclusion repair process which typically takes a little longer than the warranty replacement process. DO NOT stockpile broken PLGR at the unit or DS level. Use your local repair return procedures and see the discussion elsewhere in this newsletter. See Section 8.2 of the TM (Change 2).

If you are a Navy user, return your unserviceable unit to the supply system. Requisition a replacement through the supply system. This process is outlined in section 8.2 of the Tech Manual.

Diana Wright

Can't We Just Repair a Broken PLGR Ourselves?

Maintenance procedures at the user level for the handheld AN/PSN-11 PLGR are very limited. The PLGR is a sealed receiver and the unit is not authorized to open it. All internal repair is performed at the Rockwell Collins repair center (whether the fault is covered by the warranty or not). The maintenance procedures authorized at the unit or DS level are spelled out in the PLGR TM, Change 2 (See following article).
If you get curious and open a PLGR it will still have to be repaired by the contractor depot, but opening the PLGR will guarantee that the government gets charged the exclusion repair service fee of $307.

PM GPS does not offer a PLGR maintenance course. You can review the maintenance section in the PLGR manual, TM 11-5825-291-13. The PLGR Soldiers Guide, TB 11-5825-291-10-2, doesn't have a maintenance section but it contains useful information. If you have a specific question, contact one of the PM GPS offices.

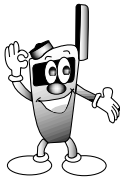
Ed McAuley

So What PLGR Repairs Are AUTHORIZED at the unit/DS level?

Organizational maintenance consists of: Replacing the internal power battery, the memory battery (annually), memory battery cap, J2/J3 connector cover, J4 connector cover, prime battery cap and troubleshooting using Built-in-Test (BIT). The owning unit typically replaces batteries while the DS level maintenance shop typically replaces the external components (battery caps and connector covers). Change 2 of the PLGR TM lists the external parts that the field is authorized to replace. These items can be requisitioned by the 31U repairman or in some remote locations by the owning unit direct. Organizational maintenance for the external power cable consists of replacing the fuse. Each year, a number of PLGR are returned to the depot repair center for replacement of these items, a task that could have been done at home station.

ITEM	NSN	Price (Jan 2001)
Memory Battery Cap assembly	5340-01-449-1033	$61.08
J2/J3 Connector cover	5340-01-449-1045	$95.98
J4 connector cover	5340-01-449-1036	$5.62
Prime Battery cap assembly	5340-01-449-1029	$22.84

Ed McAuley



How to Return a PLGR for Repair:

After confirming the failure, use your local return procedures whether that means going to your Direct Support unit for an exchange or sending the PLGR direct:

Prepare the PLGR for shipment: Use the menu to "zeroise" the crypto key. Don't use the "emergency zeroise" method or you'll erase all memory including fault codes.
Remove the main power battery (e.g. BA-5800 or battery holder with AA cells). Leave the 3.6 volt "AA" memory battery installed. Keep your accessories. Package the PLGR for in-transit protection.

Provide Essential Information: On a DD Form 1149, identify your Point of Contact, a commercial phone number and a complete return shipment address including building number and DODAAC. Specify a failure mode or write a note to explain what you think is wrong. Any information will help!

Ship by traceable means to:

DODAAC EZ7415
ROCKWELL COLLINS INC
ATTN: SERVICE CENTER, MS 139-141
855 35TH STREET NE
CEDAR RAPIDS IA 52402-3613
Mark For: AN/PSN-11 Warranty

NOTE: If you sent a PLGR in for repair and have not received the replacement after allowing for transit time, contact the Fort Monmouth office for a status check: Have your PLGR, serial numbers handy as well as the date you shipped them. Call the Fort Monmouth office at DSN 992-6136/6133, CML (732) 532-6136.

NOTE: DO NOT send a PLGR to the DRMO office for disposal! If you have a "surplus" PLGR contact your Force Modernization Office or Class VII manager to coordinate transfer within your command. If you don't have either of those agencies available, contact the CECOM Item Manager, Joe Aliamo, at DSN 992-9209 or (732) 532-9209. There is a shortage of PLGR worldwide so use the Army property accountability system to locate a new owner for your "surplus" PLGR.

Dennis Rotenberry

A Change in BA-5800A/U Battery Labels doesn't lessen your Danger!

CECOM is now accepting deliveries of a new version of the BA-5800A/U lithium-sulfur dioxide battery from Eagle-Picher Energy Products, formerly BlueStar Batteries. For the field user, the battery is unchanged but the label has been revised. Here's the deal: This new battery design was tested to allow shipment as non-dangerous goods. The battery passed the test so they DO NOT need to be transported as hazardous materials in accordance with Department of Transportation Class 9 requirements. This means that shipments of these batteries within the wholesale supply system won't require Class 9 warning labels.

How does this impact the user? It doesn't, other than you may notice the lack of the familiar Class 9 warning labels on shipments of this brand of new batteries. Caution! The BA-5800 can still be volatile in field use so you should follow all of the existing handling procedures applicable to the BA-5800/U battery! For example, store them separately from other hazardous materials and treat them carefully when inserting and removing them from receivers. Contact your local fire department for storage recommendations. For more info contact the CECOM Power Sources Center of Excellence at DSN 992-8824, CML (732) 532-8824, email: lyman@doim6.monmouth.army.mil

Patrick Lyman

Need a rugged PLGR carrying case?

One of our USAF users found a commercial carrying case that provides excellent in-transit protection for the PLGR. It is called a Protector Case, part number 1200. It is made of plastic and weighs only 3.5 lbs. According to the manufacturer, Pelican Products, it is watertight (it floats) and crushproof. Our USAF user claimed that a HMMWV could drive over it without crushing it, but please don't try that! Army and USAF users can order it through the supply system at $31.64 each using NSN 6760-01-379-3139. Navy users must buy it direct from the manufacturer, Pelican Products, Mr. Jim Errington, at (800) 473-5422 or (310) 257-5620. (Buying direct may cost more depending on quantity). Note this case is intended to protect equipment while in-transit, not while in mission use. It comes filled with perforated dense foam blocks which you tear away in pre-cut squares to form a cavity custom fitted to whatever equipment you want to protect. You can view the case at www.pelican.com. The product is not a basic issue item but if you need in-transit protection this case might be an excellent solution.

Michael Wilkin

Expired Group Unique Variable (GUV) Key?

Military GPS receivers use a COMSEC Group Unique Variable (GUV) key to access the Precise Positioning Service (PPS)

signal. The GUV key is an annual key. If your PLGR indicates “check GUV issue” you probably have an out-of-date GUV key and need to replace it. If you loaded a new key and the PLGR indicates “invalid key” or “bad key detected,” try reloading. If it still rejects, you might be trying to load an out-of-date key! It happens. In these cases, be sure you have the current GUV key and try reloading. GUV key issues can usually be resolved locally without having to return the PLGR to the manufacturer repair center. Check Change 2 of the PLGR TM for more info. Contact your designated COMSEC custodian for the current GPS GUV key.

Jim Buggy

Electronic Safety Equipment for Kosovo

Although the PLGR was first introduced back in 1994, it is still the most popular and versatile device for getting military GPS position location data. Witness the recent application of PLGR to support the electronic safety equipment installed to US Army vehicles operating in Bosnia. Last May, about 70 HMMWVs were equipped with Enhanced Information Systems (EIS) that enabled the American command base in Tuzla to monitor the location of vehicles on patrol and stay in contact with them via e-mail. In addition, the system also allows soldiers in the HMMWVs to track their location and other patrol vehicles.

Based on the success of this effort, a team at Tobyhanna Army Depot is coordinating a new initiative to equip about 430 more vehicles in Kosovo with this electronic safety equipment package. Consideration is also being given to field the system in Germany and Italy. It includes a computer, keyboard, monitor, antenna and PLGR.

As part of the EIS project, the team wanted to reduce the wear and tear on the PLGR connectors and avoid having the computer detect a “break in connection to external device.” They did this by designing a locally fabricated security bracket to secure the PLGR in the installation. This meant the PLGR did not have to be removed for safekeeping every time the vehicle was parked. NOTE: The security bracket is not part of an official PLGR installation kit. Its use is subject to local command policy concerning security procedures for high value pilferable items. For more information on the EIS program, contact the program leader, Gerry Musto at Tobyhanna Army Depot, DSN 795-7708 CML (570) 895-7708

Disposition for Legacy Aircraft GPS Systems

Over a decade ago, the Army stopped buying the large AN/ASN-149 Aircraft GPS receiver system in favor of smaller equipment that integrated GPS with either Doppler or Inertial navigation systems. The new designs saved weight and space in the aircraft. But the Army had already purchased over 500 AN/ASN-149 receivers and it was important to make good use of them. The sets were installed in a variety of aircraft including the VIP fleet in Washington DC. Over time, the number of AN/ASN-149 systems in use has steadily declined as they were replaced by the smaller integrated designs. During 1999-2000, the remaining stock of these receivers was upgraded to extend their service life. . They are now used in a limited number of Army aircraft, mostly in Guardrail units. If anyone has a stock or spare AN/ASN-149 receiver or the supporting test set, they should contact Walt Coffing at DSN 992-9155 for disposition instructions.

AN/ASN-149 system and support equipment that should be turned in:

ITEM, NSN and comment:

- AN/GSM 336V4, 6625-01-347-1757 HaveQuick ITS-B Test Set. Contains the Plug-In Unit PL1515A/G. All other models and plug-ins are obsolete.
- Receiver UH R2400F/A, 5826-01-343-4083 Obsolete version, no longer used.
- Receiver UH R2400G/A, 5826-01-343-4084 Modified to J/A version.
- Receiver UH R2400J/A, 5826-01-447-1298 This is the only GPS Receiver MDL that the GSM336V4 Test Set will work with.

Walt Coffing at DSN 992-9155 CML (732) 532-9155

I heard someone say they have PLGR +96 Software. Is that different from standard PLGR software? Am I missing something?

Yes and No! Yes, a special version of PLGR software called PLGR+96 was obtained for use by a handful of Army units to support field testing of a particular laser range finder system. No, this software HAS NOT been fully tested or approved for field use.

There are only 2 Army organizations authorized to use this non-standard software.

For all other PLGR users, the current version of PLGR (displayed on power up) ends in either 003 or 008 depending on your PLGR: If you somehow "accidentally" loaded PLGR+96 software into your PLGR, you may have problems. Contact Frank Rowe at the Georgia office for advice on what to do. Any PLGR returned to the Rockwell Collins repair center is reloaded with standard software. The two locations authorized to operate PLGR+96 are equipped to reinstall their "special" software in PLGR after they are repaired as needed.

Frank Rowe at DSN 468-9511

Is there another version of GPS called "Galileo"?

Several years ago, the European Space Agency (ESA) and the European Commission (EC) got serious about building a European version of GPS. The idea was to develop a global navigation satellite system independent of US government control. It was named after Galileo, the 17th Century Italian astronomer and physicist, 1564 - 1642. The Galileo program has struggled to find its role and source of funding. One study suggested that Galileo partner with the automobile industry to provide "navigation services for a fee." By contrast, the American GPS system does not charge a user fee. In December 2000, the European transport ministers met to review the commitment of their governments to Galileo. The program did not get a clear "go ahead" signal but it didn't get the axe either. If the European Union governments fund the program, it will move from the development phase into testing and production. The earliest date that Galileo navigation signals will be available to users will be sometime after 2008. In the meantime, European users continue to enjoy free access to the GPS signal courtesy of the US government. There is no US plan to impose user fees similar to those being considered as a means of paying for the development and operation of Galileo.

What is a Psuedolite?

Psuedolite is a combination of "psuedo" and "satellite". Since "psuedo" is defined as a "false or fictitious name" psuedolite means "imitation satellite." More precisely it means an imitation satellite signal. A DoD agency with access to GPS signal technology can create a signal that appears to be coming from a satellite. But instead of launching a $200M satellite, the agency uses a much less expensive "temporary" transmitter such as a ground-based tower or in an aircraft. Why? It might be useful to provide a strong signal close in to a geographically concentrated area of operation in order to counter hostile attempts to interfere with space-based signals. So, psuedolites could provide additional protection to authorized users in an area of operation. Because their range is limited, psuedolites are not replacements for the GPS satellites. After all, worldwide coverage for global navigation was the rationale for developing GPS as a satellite-based system in the first place. Today's environment presents some potential GPS signal security challenges and the psuedolite may be one way to ensure that authorized users have access to the PPS signal.

Del Crane

A Leading Cause of PLGR Failures: Excessive Power / Incorrect Hook-Up

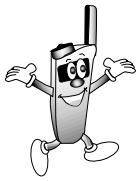
During the last year, approximately 75 PLGR were returned for repair with problems traced to excessive power or incorrect hook-up. 40% had a fried J2 serial port connector; 49% had a fried J4 power connector, and 11% had damage to other connectors. Less than half of these repairs were judged to be warranted repairs. The

rest were repaired as “warranty exclusion damage” at a cost in excess of $200,000! These numbers indicate a clear need to do a better job when connecting PLGR to external power!

If you install PLGR for external power and to provide GPS data to other systems, please read and heed the following article!

In addition, 92% of the PLGRs that were damaged beyond repair indicated that the fatal failure was induced through the J2 port which connects to vital internal components. Again, the culprit was the connection between the PLGR and an external device.

Ed McAuley



There is a correct sequence for connecting and disconnecting the PLGR power cable: “Last to Attach - First to Let Go”

A PLGR can be easily installed to a wide range of vehicles to tap external power and provide GPS data to an electronic device. There are many examples of PLGR installations in the Army today. But it has to be done correctly to protect both the PLGR and the connected system! Good PLGR installations can reduce your battery costs and provide accurate position data to communication, navigation or fire control devices. Bad PLGR installations can damage or destroy equipment and interfere with mission accomplishment.

Assuming you’ve installed a PLGR mount in the vehicle, observe the following sequence when installing or removing the PLGR receiver in the mount:

First, verify a common ground! The PLGR and the electronic device you connect it to should share a common ground before you make any power connections! The PLGR power cable wire with the in-line fuse is your “hot” positive wire.

Second, connect the data cable (as well a the remote antenna cable if used) then connect the power cable when installing PLGR. Conversely, when you remove the PLGR, first disconnect the power cable and then the data and antenna cables.

If despite your careful effort, the “hot” tip of the power cable shorts out, it should blow the in-line fuse. That’s okay - replacing the fuse costs a lot less than letting the short damage the PLGR and/or the electronic device!

For some PLGR vehicle installations involving expensive devices such as laptop computers, some programs have developed special grounding cables or procedure to reduce the chance of damage from an improper ground. For example, the FBCB2 program provides a ground strap to establish the all-important grounding.

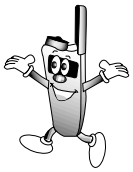
PLGR Connect Procedure:

1. Check the Common Ground!
2. Connect Serial port cable
3. Connect Remote Antenna cable (if used)
4. Connect power cable
5. Install PLGR in mount

Disconnect Procedure:

1. Remove PLGR from mount
2. Disconnect power cable
3. Disconnect Remote Antenna cable (if used)
4. Disconnect Serial port cable
5. Detach ground (if connected to PLGR)

And one more reminder: Do not leave a BA-5800 battery installed to your PLGR while connected to a source of external power!



Ed McAuley and Joe Meskill

Keep Your Guard Up!

With US and Allied forces increasingly dependent upon GPS to coordinate a wide range of missions, you can expect potential adversaries to try to deny you the use of GPS. Typical denial efforts will take the form of “Jamming” or “Spoofing.” Jamming is the intentional interference of GPS transmission frequencies. Spoofing is providing a false GPS signal to users. The Joint Program Office takes these potential problems seriously and is developing new protection features in the next generation of GPS technology. It will take years to upgrade all elements of the GPS system in order to implement these new defenses.

In the meantime, you can take several steps to gain the highest level of protection today: Your first line of defense is always to operate in PPS mode! Second, employ physical countermeasures to shield your receiver.

The PLGR Soldiers Guide explains some of these protections. More details are presented in the GPS system tutorial CD.

(If you don't have the CD, it is available as an FOUO item, NSN 7644 01 445 4559. Your unit training and supply officers should be able to order it through the Defense Supply Center in Richmond VA. If you need help, contact Dennis Rotenberry at Fort Monmouth at DSN 992-6133.)

Another tip: Refresh yourself on how to check your PLGR status screens to see if interference is detected or if it is degrading receiver performance.

Jim Buggy

"Hot Start" to Transfer PLGR Data in an E/W Environment!

If you find yourself operating in an electronically challenged environment, a useful procedure to know is how to transfer data from an operating keyed PLGR to a second PLGR. This process is known as a "Hot Start" and it will expedite the process of bringing the second PLGR online quickly so it can access the PPS signal to gain protection from jamming and spoofing that could prevent PPS acquisition on its own from a "cold start." The process is simple and involves connecting two receivers with the PLGR to PLGR cable (P/N 426-0141-020). Select the Data-Transfer (DATA-XFR) option from page two of the PLGR "menu" page. Select "SV Data" and initiate the data transfer.

Transmitting "hot data" will speed the ability of the second PLGR to acquire the PPS signal for maximum protection in a hostile electronic environment. For more information on the transfer process, refer to the PLGR Soldier's Guide or the PLGR TM.

Jim Buggy

How to Contact PM GPS

Army PM GPS has offices in California, Georgia and New Jersey under the direction of LTC Eveland who is located at the Los Angeles Air Force Base. Email sent to any of these contacts will be forwarded to the right office for reply.

For PM GPS and the Technical Management Division (TMD) at Los Angeles, CA call (310) 363-0595 or DSN 833-0595. Email: del.crane@LOSANGELES.AF.MIL

For the Georgia Field Office (GFO) at Warner-Robins, GA call (912) 926-3288 or DSN 468-3288. Email: johnny.walker@ROBINS.AF.MIL

For the Readiness Management Division (RMD) at Fort Monmouth, NJ call (732) 532-4733 or DSN 992-4733. Email: james.buggy@mail1.monmouth.army.mil.

Who to Call?

For new technical installation advice, new product information (SAASM, DAGR) technical test reports and acquisition support planning, call TMD.

For sustainment management including software support, supply support, technical publications and accessory procurement, call GFO.

For fielding, equipment authorizations, host vehicle installation assistance, and New Equipment Training, call RMD.

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PM GPS
Attn: AMSEL-DSA-GPSR
Squier Hall
Fort Monmouth, NJ 07703

ACCT #89

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